INDIAN JOURNAL OF SOCIAL ECONOMICS
Vol. 1, No. 1, 2025, pp. 55-84 • ISSN: 3049-3544

URL: www.arfjournals.com
https://doi.org/10.47509/IJSE.2025.v01i01.05

"The Growth Effects of Social Sector Spending in India"

Jitendra Kumar Sinha
Retired Sr. Jt. Director & Head, DES, Bihar.
Current City: Bengaluru (Karnataka), INDIA
E-mail: jksinha2007@rediffmail.com

To Cite this Article

Jitendra Kumar Sinha (2025). "The Growth Effects of Social Sector Spending in India". *Indian Journal of Social Economics,* 1: 1, pp. 55-84.

Abstract: The relationship between social sector spending and long-term economic growth is well-documented across both advanced and emerging economies. This study empirically investigates the causal nexus between public expenditure on social sectors and economic development in India over the period 1974–75 to 2023–24, utilizing annual time-series data. To ensure robust statistical analysis, the stationarity of the variables is tested using Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit root tests. Causality is examined within a multivariate econometric framework, allowing for the identification of directional relationships among the variables.

The study focuses on disaggregated public expenditure across key social sectors—education, family welfare, housing, urban development, water supply and sanitation, nutrition, social security, welfare, labor and labor laws, and the welfare of scheduled castes and tribes—and explores their linkage with economic growth, represented by GDP per capita. The findings indicate a statistically significant bi-directional causality between GDP per capita and expenditures in all major social sectors, except health. In contrast, health expenditure shows a unidirectional causal relationship from spending to economic growth, positioning it as an exogenous driver of development rather than a sector influenced by growth dynamics.

These results underscore the pivotal role of comprehensive social investments in fostering economic development, reinforcing the argument that human capital formation, welfare improvement, and infrastructure development in social domains generate positive spillover effects on economic performance. The study offers valuable insights for policy-making, emphasizing the need for targeted public expenditure, especially in health and education, to promote inclusive and sustainable growth. This research contributes to the policy debate by illustrating that strategic investments in the social sector not only address equity challenges but also lay the foundation for sustained economic progress in large developing economies such as India.

Received : 28 April 2025 • **Revised :** 30 May 2025 • **Accepted :** 10 June 2025 • **Published :** 30 June 2025

Keywords: Social Sector Expenditure, Economic Growth, Per Capita GDP, Human Development, Human Capital Formation, Public Sector Investment, Social Welfare, Economic Development, Policy Implications

1. Introduction

Public expenditure in the social sector—covering domains such as education, health, sanitation, social security, and welfare programs—constitutes a fundamental pillar of sustainable economic development. Rooted in the human capital framework advanced by Schultz (1961) and Becker (1964) [1–2], investments in social sectors are widely acknowledged as instrumental in fostering productivity enhancement, poverty alleviation, and inclusive growth. The theoretical justification for such expenditure rests on three interrelated channels. First, education outlays strengthen human capital formation by equipping individuals with skills and knowledge that improve employability, earnings, and innovation capacity. Second, health-related spending enhances labor productivity by reducing morbidity, extending life expectancy, and enabling greater workforce participation. Third, well-targeted social safety nets cushion vulnerable groups against economic shocks, moderate inequality, and preserve social stability—conditions that underpin resilient and sustained economic progress.

Empirical research across advanced and developing economies has consistently highlighted the growth-enhancing potential of social sector expenditure, though the extent and direction of the effects often hinge on institutional quality, policy effectiveness, and the macroeconomic environment. In the context of developing nations such as India—characterized by structural rigidities, resource constraints, and significant demographic transitions—the investigation of causal linkages between social spending and economic growth becomes particularly salient.

Over the last two decades, India has undertaken wide-ranging social policy reforms designed to strengthen welfare provisioning and address chronic development deficits. Landmark interventions include the Right to Education Act, which institutionalized universal and compulsory schooling; Ayushman Bharat, which extended health insurance to economically weaker households; and Swachh Bharat Abhiyan, which substantially improved sanitation outcomes and reduced open defecation. Complementary initiatives such as Swayam, aimed at enhancing digital education delivery, and the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), which ensures minimum employment opportunities

for rural households, have reinforced human development outcomes. Furthermore, nutrition and food security measures under the National Food Security Act have safeguarded minimum consumption thresholds, thereby strengthening the resilience of marginalized groups.

These initiatives have translated into measurable improvements in human development indicators—rising literacy rates, increased access to sanitation, enhanced healthcare coverage, and broader welfare entitlements. They have also contributed to India's improved standing in global human development indices, drawing international acknowledgment from organizations including the World Health Organization (WHO) and the United Nations Development Programme (UNDP). Despite these advances, however, a critical empirical question persists: do rising social expenditures generate reciprocal economic dividends, or are they predominantly outcomes of higher national income levels?

This study seeks to address this research gap by systematically analyzing the causal relationship between social sector expenditure and economic development in India over the period 1974–75 to 2023–24. Employing rigorous econometric methodologies—including Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit root tests for assessing stationarity, alongside causality and cointegration analysis—the paper examines whether social spending functions primarily as a catalyst for economic growth, as a derivative of rising incomes, or as a mutually reinforcing process. The results are expected to yield evidence-based insights with significant implications for fiscal prioritization and policy formulation, thereby advancing the discourse on inclusive and sustainable development.

2. Why Invest in Social Sector

Public investment in India's social sector—spanning education, healthcare, sanitation, and welfare schemes—demonstrably supports economic growth through multiple interlinked channels: human capital accumulation, improved labor productivity, poverty alleviation, and enhanced social stability. Recent empirical evidence reinforces these theoretical linkages.

2.1. Human Capital Development

Educational expenditure in India has had a measurable effect on human resource development. Using Granger causality tests, Patel and Annapoorna (2019) [3] found that public education spending significantly influences human resource formation.

In Odisha, regression analysis shows a strong positive association between education infrastructure spending (relative to GSDP) and economic growth, mediated through higher gross enrollment ratios at the primary and secondary levels. More broadly, government education spending from 2000 to 2022 correlates strongly with GDP growth, with an estimated ₹1 crore increase in education outlay associated with a ₹24 crore rise in GDP. Nonetheless, despite gains, education expenditure remains below the Kothari Commission's 6% of GDP target, undermining potential long-term growth

2.2. Health and Productivity

Health spending also yields significant economic benefits. The 2023-24 Economic Survey highlights the multiplier effect of Ayushman Bharat—saving more than ₹1.25 lakh crore in out-of-pocket expenses and improving financial stability, notably via a 3.7–4.0 percentage-point decline in microfinance NPAs in implementing districts. Earlier reports (2020–21) revealed a 54% increase in household health insurance coverage in states adopting PM-JAY, compared to a 10% decline in non-implementing states. These outcomes indicate that broader health access translates into economic resilience and workforce productivity. Moreover, a comparative VAR analysis across South Asian countries confirms that health spending significantly boosts human development in the short run in India and Bangladesh.

2.3. Social Safety Nets and Poverty Reduction

Targeted social welfare schemes have delivered positive returns in poverty reduction and income stability. An empirical Difference-in-Differences analysis of NREGA shows significant reductions in rural poverty in districts where the program was implemented, with especially strong effects in the most impoverished areas. However, critiques exist—some analysts argue that NREGA's fiscal returns are inefficient, suggesting that for every Re 1 of rural income generated, over Rs 4 in spending may be required. Broadly, welfare programs like NREGA and NFSA help stabilize household incomes, fuel demand, and reduce inequality, undergirding growth.

2.4. Infrastructure and Institutional Alignment

Investments in basic education infrastructure—such as classroom facilities, sanitation, and digital tools—enhance learning outcomes and, by extension,

economic benefits from education. The case of Odisha illustrates that combining infrastructure improvements with enrollment boosts yields substantial economic gains.

2.5. Challenges and Scope for Improvement

Despite evident benefits, limitations remain. Education spending continues to fall below international benchmarks (6% of GDP), restraining progress toward global competitiveness and knowledge economy readiness. In health, while programs like PM-JAY have expanded access, rural-urban disparities in healthcare provision persist. Some interventions, such as NREGA, face questions of cost-effectiveness and administrative waste, highlighting the need for better monitoring and targeting.

Empirical evidence across multiple social sectors validates that public expenditure on education and health contributes meaningfully to human capital formation, productivity enhancement, poverty alleviation, and economic growth. While India's social sector spending aligns with international development goals, sustained increases in fiscal allocation—especially toward education and primary healthcare—alongside improved program efficiency and equitable delivery, are imperative to unlock further developmental gains.

3. Trends in Development Expenditure and Sectoral Interdependencies

The macroeconomic literature consistently underscores the dual importance of social and economic progress as fundamental drivers of long-term economic development (Sen, 2005; Devi, 2005) [4-5]. Empirical studies across both developing and developed economies highlight that balanced investments in human capital and economic infrastructure not only foster sustained growth but also promote equity and social cohesion. Over recent decades, India's fiscal policy trajectory has actively aimed to integrate these complementary objectives.

Historically, developmental expenditure has represented approximately 60% of India's total public spending, reflecting the government's sustained emphasis on fostering growth through strategic investments (Figure 1). Within this framework, social sector expenditure has shown a marked increase, rising from 28% of total expenditure in 1975 to 35% in 2019, while outlays on economic sectors have remained relatively stable at around 30%. This shift signals a policy reorientation towards improving human development outcomes alongside the expansion of physical infrastructure.

When expressed as a percentage of GDP, the growth in developmental expenditure becomes even more pronounced. Between 1985–1986 and 2021–2022, total developmental outlays expanded from approximately 1% of GDP to nearly 17%, with social sector spending growing from 0.27% to 9.58% of GDP. These trends underscore a growing recognition of the positive multiplier effects stemming from public investments in both social and economic sectors:

Social sector investments—especially in education, healthcare, sanitation, welfare, and nutrition—have been shown to enhance labor productivity, improve public health outcomes, and promote social stability, all of which are critical for sustaining economic growth.

Economic sector investments—including infrastructure, industry, transportation, and technology—serve to expand productive capacity, enhance competitiveness, and enable structural transformation of the economy.

India's evolving expenditure profile illustrates the intricate interdependence between social and economic development. This underscores the understanding that long-term, sustainable economic growth requires simultaneous investments in human capital and productive assets (Figure 1). The increase in development expenditure relative to GDP further reflects the government's fiscal commitment to broad-based, inclusive growth, aligned with global development frameworks such as the Sustainable Development Goals (SDGs).

Identification of Social Sectors and Their Economic Linkages

This study undertakes a systematic analysis of sector-specific public expenditure across ten critical social sectors, with the objective of evaluating their interlinkages and potential causal relationships with economic growth. The selected sectors encompass the following domains: i). Education, Sports, Art, and Culture (EASC); ii). Medical and Public Health (MPH); iii). Family Welfare (FW); iv). Water Supply and Sanitation (WSUPSA); v). Housing (HOU); vi). Urban Development (UDEV); vii). Welfare of Scheduled Castes, Scheduled Tribes, and Other Backward Classes (WSCST); viii). Labor and Labor Welfare (LLW); ix). Social Security and Welfare (SSW); and x). Nutrition (NUT).

These sectors collectively represent the core dimensions of social development. By mapping public expenditure patterns within each sector, the paper seeks to assess their relative contribution, dynamic interactions, and overall role in fostering inclusive and sustainable economic growth. Among these, education sector spending

is dominant, accounting for nearly 4% of GDP, while the remaining nine sectors each receive between 0.5% and 1% of GDP (Table 1). The analytical focus of this study lies in disentangling the sector-specific causal linkages between these expenditures and aggregate economic growth, providing an evidence-based foundation for prioritizing social sector allocations within India's fiscal policy framework.

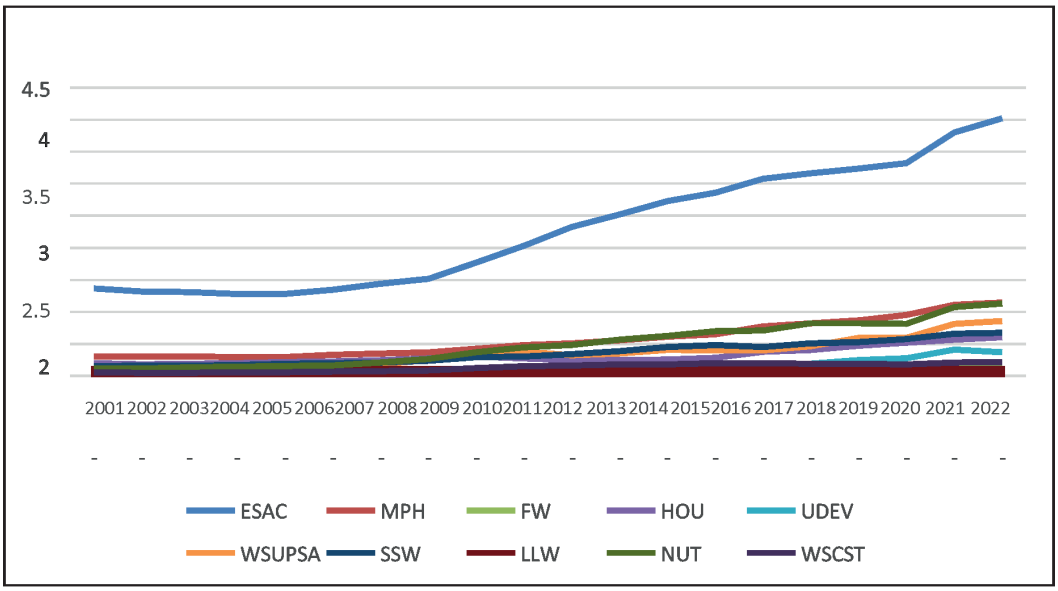

Figure 1: Composite Expenditure of State and Central Governments as a Percentage of Aggregate Government Expenditure.

(Authors Construct based on data from EPWRF)

Table 1: Social Sector Expenditure in India as a Percentage of Gross Domestic Product (GDP)

Year	*ESAC*	*MPH*	*FW*	*HOU*	*UDEV*	*WSUPSA*	*SSW*	*LLW*	*NUT*	*WSCST*
2002-03	1.367	0.306	0.055	0.196	0.041	0.069	0.150	0.028	0.114	0.057
2003-04	1.314	0.299	0.055	0.181	0.039	0.079	0.159	0.025	0.112	0.050
2004-05	1.312	0.299	0.051	0.192	0.044	0.085	0.164	0.025	0.132	0.048
2005-06	1.279	0.296	0.049	0.198	0.046	0.113	0.167	0.027	0.143	0.056
2006-07	1.284	0.296	0.046	0.221	0.052	0.121	0.185	0.027	0.149	0.059
2007-08	1.350	0.326	0.047	0.231	0.046	0.118	0.198	0.028	0.160	0.068
2008-09	1.439	0.349	0.048	0.241	0.060	0.176	0.211	0.039	0.206	0.076
2009-10	1.513	0.368	0.052	0.278	0.073	0.242	0.239	0.034	0.263	0.090
2010-11	1.774	0.420	0.064	0.305	0.101	0.365	0.289	0.040	0.367	0.119
2011-12	2.037	0.478	0.076	0.270	0.089	0.378	0.301	0.044	0.440	0.147

Year	*ESAC*	*MPH*	*FW*	*HOU*	*UDEV*	*WSUPSA*	*SSW*	*LLW*	*NUT*	*WSCST*
2012-13	2.321	0.510	0.082	0.245	0.114	0.323	0.339	0.049	0.481	0.162
2013-14	2.526	0.560	0.088	0.248	0.113	0.346	0.390	0.050	0.567	0.180
2014-15	2.726	0.616	0.104	0.259	0.141	0.406	0.448	0.064	0.620	0.184
2015-16	2.866	0.653	0.106	0.288	0.140	0.398	0.478	0.071	0.693	0.201
2016-17	3.079	0.770	0.147	0.373	0.190	0.394	0.455	0.071	0.710	0.194
2017-18	3.167	0.821	0.147	0.404	0.192	0.463	0.512	0.062	0.821	0.190
2018-19	3.239	0.870	0.147	0.471	0.242	0.598	0.532	0.061	0.821	0.185
2019-20	3.324	0.952	0.159	0.515	0.277	0.593	0.577	0.070	0.807	0.178
2020-21	3.803	1.115	0.185	0.570	0.409	0.814	0.657	0.092	1.078	0.206
2021-22	4.021	1.145	0.195	0.605	0.364	0.856	0.673	0.106	1.129	0.213

Source: Authors Calculation.

4. Government Commitment to Social Sector Development

Despite India's emergence as the world's fifth-largest economy, a considerable segment of its population remains reliant on state-provided essential services. Recognizing this reality, the Economic Survey 2020–21 emphasized that "the government is committed to investing in social sectors such as education, healthcare, skill development, employment opportunities, housing, and sanitation to bring overall improvement in socio-economic indicators and achieve SDGs" (Vol. 2, p. 361). This explicit policy orientation highlights the centrality of the state in advancing human development outcomes while addressing entrenched structural challenges, including illiteracy, malnutrition, poverty, and unemployment.

The allocation of fiscal resources toward these critical domains reflects an effort to integrate national development priorities with the broader framework of the United Nations Sustainable Development Goals (SDGs). To augment public spending, India has progressively diversified its resource mobilization strategies. One such initiative is the establishment of a Social Stock Exchange (SSE), envisaged as a platform to channel domestic and international capital into socially impactful enterprises and non-profit organizations. By linking private investment with developmental objectives, the SSE is expected to complement government initiatives and enhance accountability in social financing. Concurrently, the Corporate Social Responsibility (CSR) mandate under the Companies Act, 2013—which requires qualifying firms to allocate 2–3% of their net profits to socially beneficial activities—has substantially increased private sector participation in social development. The Securities and Exchange Board of India (SEBI), along with the SSE Advisory Panel,

is in the process of finalizing regulatory frameworks to ensure that resource flows are effectively aligned with priority sectors and policy targets.

In addition, India has begun to employ innovative financing instruments such as social impact bonds and green bonds to attract long-term private capital for socially and environmentally sustainable projects. These instruments not only expand the pool of developmental finance but also mitigate fiscal constraints, diversify risk-sharing, and accelerate progress toward the SDGs. By combining budgetary support with market-based financing mechanisms, India is attempting to create a hybrid model of social sector development that strengthens resilience, fosters inclusivity, and ensures sustainability in line with its Vision 2030 agenda.

5. Structure of the paper

The structure of the present paper is organized as follows:

Section 6 presents the theoretical underpinnings and conceptual perspectives on social sector expenditure.

Section 7 critically reviews the relevant empirical literature, situating the study within the broader research discourse.

Section 8 describes the data sources and elaborates on the methodological framework employed in the analysis.

Section 9 reports and interprets the empirical results, highlighting key patterns and causal linkages.

Section 10 summarizes the major conclusions derived from the findings.

Section 11 formulates policy recommendations aimed at strengthening social sector investment in India.

Section 10 acknowledges the study's limitations and proposes avenues for future research.

6. Theoretical Perspective

(i) Human Resource Development Approach

The Human Resource Development (HRD) approach posits that investment in social sectors contributes directly to the accumulation of human capital, defined as "the stock of skills, competencies, and productive knowledge embodied in individuals". In economic terms, human capital represents the capacity of individuals to participate productively in the labor market and generate income. This framework was formalized in the seminal works of Schultz (1961) (2) and Becker (1962) (1),

who argued that human capital formation occurs through deliberate investment in education, health, skill development, on-the-job training, and access to labor market information.

Expenditures in sectors such as education, health, and labor welfare enhance the productivity of the workforce and are justified on two principal grounds:

Higher Financial Returns: Education spending increases individual earning capacity and contributes to higher per capita income at the macroeconomic level.

Improved Firm-Level Productivity: Investment in health raises the physical and cognitive capacity of workers, leading to higher productivity within firms and industries.

Although often conflated with human development, the HRD approach is distinct in its orientation. Human development—as defined by the United Nations Development Programme (UNDP)—is "the process of enlarging people's choices and focuses on the state of existence of people, including empowerment, equity in basic capabilities, cooperation, sustainability, and security." This paradigm regards individuals as ends in themselves, rather than simply as inputs to economic production.

In essence, while the HRD approach emphasizes the means of economic progress by enhancing the productive capabilities of individuals, the human development approach emphasizes the ends—the overall well-being and quality of life of individuals. Nevertheless, these two perspectives are complementary: human resource development establishes the preconditions for human development, which in turn supports sustained economic growth.

(ii) Social and Economic Development

Assessing the impact of social sector expenditure on economic development requires first understanding how such spending manifests as social development. According to UNDP, social development is a form of "sustainable human development that enhances human capabilities for enlarging human choices." It involves three interrelated components:

Social Services: Provision of essential services such as health care, primary and secondary education, and skill development programs.

Social Transfers: Measures including social security schemes, targeted livelihood support, and employment programs that provide economic resilience to vulnerable populations.

Social Integration: Initiatives aimed at reducing conflict, promoting equity, and strengthening social cohesion through participatory governance and peace-building efforts.

Empirical studies by Street (1981) [6], and Ghai (2000) [7], demonstrate that robust state capacity, effective governance, infrastructure readiness, and a leadership committed to equitable social service delivery are crucial determinants of social development. The composition of social spending—particularly prioritizing primary education and basic health services—has been shown to generate the greatest long-term returns.

Social development is thus understood as a transformational process that reshapes societal values, institutions, and practices through deliberate policy and planning, with the active participation of communities. It is directed toward raising living standards and enhancing quality of life. In contrast, economic development is conventionally measured by quantitative indicators such as per capita income, per capita value-added, and sectoral output growth.

While social development and economic development are conceptually distinct, they are mutually reinforcing. Social investments expand human capabilities and social cohesion, creating the conditions necessary for sustained economic growth, while economic gains provide the resources to deepen and broaden social development initiatives.

7. Literature Review

The relationship between public expenditure and economic development has been widely debated, with empirical evidence yielding mixed results. Public spending in social sectors such as education, health, and basic infrastructure is generally considered critical for fostering inclusive, healthy, and economically productive societies, thereby enhancing labor productivity and long-term growth [Mundle, 1998 (8); Arora, 2001 (9); Guha and Chakraborty, 2003 (10); Majumder, 2004 (11); Dev and Ravi, 2007 (12); Kannan and Pillai, 2007 (13); Sen and Karmakar, 2007 (14); Sinha, 2019, 2021, 2023 (15–17)]. However, evidence from African economies highlights adverse or insignificant effects of public expenditure on education and health, largely attributable to corruption, bureaucratic inefficiency, and chronic underinvestment [Eggoh et al., 2015 (18)]. Similarly, Kormendi and Meguire (1985) (19) found no systematic link between social sector spending and economic growth.

Education and health remain the two pillars of social sector investment. Gupta and Verhoeven (2001) (20) assessed the efficiency of social spending in 37 African countries compared to Asia, Europe, and the Americas, demonstrating resource misallocation caused by inflated government wages and weak intra-sectoral priorities rather than inadequate private spending. Gupta et al. (2002) (21) observed that India's efforts to expand schooling and reduce child mortality led to substantial increases in public investment in these sectors.

Public health expenditure mitigates risks from malnutrition, infant and maternal mortality, and communicable diseases, while simultaneously improving quality of life and building human capital [Arora, 2001 (9); Bloom and Canning, 2005 (22); Majhi and Malik, 2018 (23)]. Expenditure on transport and communication infrastructure has been shown to facilitate socioeconomic linkages and accelerate growth [Esfahani and Ramirez, 2003 (24); Hong et al., 2011 (25)], whereas investment in sanitation and safe drinking water generates significant productivity and welfare gains [Purohit, 2014 (26); Pattayat and Rani, 2017 (27)]. Moreover, public expenditure on social security improves the educational and health conditions of vulnerable groups, thereby enhancing living standards and labor market participation [Ohlan, 2013 (28); Sen and Sahu, 2017 (29)]. Collectively, these findings suggest that well-targeted investment in education, health, and basic infrastructure aligns public and private interests, enhancing productivity and promoting broad-based development.

The cyclical behavior of social spending also varies by development level. Doytch et al. (2010) (30) found that in middle-income economies, education expenditure is largely acyclical, while health spending tends to be pro-cyclical. In high-income countries, however, education and health spending exhibit counter-cyclical patterns, increasing during economic downturns. Del Granado et al. (2013) (31) further demonstrated that in developing economies, social spending is generally pro-cyclical, while in developed economies it is more stable or mildly counter-cyclical.

The role of education in sustaining long-term growth is extensively documented. Lucas (1988) (32) emphasized human capital as a driver of economic and social progress, while Becker, Murphy, and Tamura (1990) (33) showed that education spending is critical for per capita income growth. Blundell et al. (1999) (34) provided econometric evidence linking an educated labor force to economic efficiency, with higher education playing a more pronounced role in developed countries. Ranis, Stewart, and Ramirez (2000) (35) demonstrated strong causality between human

resource development and growth, underscoring the transformative potential of education.

Theoretical contributions by Pissarides (2000) (36) support such investments, while Douglass (2010) (37) highlighted education as a source of efficiency and global competitiveness. For India, Dukkipati (2010) (38) argued that doubling higher education enrolment is essential to harness the demographic dividend, warning of adverse economic consequences if educational infrastructure remains inadequate. Bhatia and Dash (2013) (39,42) noted that developed nations allocate a larger share of GDP to education and recommended free education up to the graduate level in India to strengthen human resource development. Cross-country studies by Musai et al. (2011) (40) and Mallick et al. (2016) (445) confirmed a positive long-run relationship between education expenditure and economic growth.

Institutional quality also conditions the impact of educational spending. Ghosh Dastidar et al. (2013) (41) argued that the growth impact of educational investment depends on governance structures and policy effectiveness. Shi (2014) (43) demonstrated that both education and health expenditure are income-elastic, while Mehdi and Chaudhry (2015) (44) projected that India's workforce could outpace China's by 2030 if human capital investment is adequate. Li et al. (2017) (46) documented China's success in expanding basic education but warned that sustaining future growth will require more advanced skill formation.

Finally, competing theories provide different perspectives: human capital theory regards education as a direct enhancer of productivity, whereas signaling theory interprets it as an indicator of worker ability. In the Indian context, Unni and Sarkar (2012) (47) highlighted persistently low education levels among disadvantaged groups and stressed improving access to formal education as a prerequisite for raising labor productivity and signaling workforce quality.

8. Methodological Framework

The study employs annual time-series data for India spanning the period 1973–74 to 2022–23, incorporating ten indicators of social sector expenditure alongside key measures of economic development, including Gross Domestic Product (GDP) and per capita income (see Table 2). The expenditure categories encompass education, sports, art, and culture; medical and public health; family welfare; water supply and sanitation; housing; urban development; welfare of Scheduled Castes, Scheduled Tribes, and Other Backward Classes; labor and labor welfare;

social security and welfare; and nutrition. All data have been sourced from the EPWRF India Database.

Table 2: List of Variables

Variable	Definition
GDPPC	Per Capita Gross Domestic Product
ESAC	Education, Sports, Art, and Culture
MPH	Medical and Public Health
FW	Family Welfare
WSUPSA	Water Supply and Sanitation
HOU	Housing
UDEV	Urban Development
WSCST	Welfare of Scheduled Castes, Scheduled Tribes, and Other Backward Classes
LLW	Labor and Labor Welfare
SSW	Social Security and Welfare
NUT	Nutrition

To investigate the dynamic relationship between social sector expenditure and economic development, the study applies a battery of econometric techniques designed to assess causality and long-run linkages. Specifically, the Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit root tests are employed to examine the stationarity properties of the time series. The general specification of the ADF test can be expressed as follows:

$$\Delta Yt = \alpha 0 + \alpha 1t + \alpha 2Yt - 1 + \sum \alpha j \, \Delta Yt - j + \varepsilon t \qquad (1)$$

The Augmented Dickey–Fuller (ADF) test examines the null hypothesis that a given time series possesses a unit root, implying non-stationarity. The null hypothesis is rejected when the absolute value of the computed ADF test statistic exceeds the corresponding critical value at a chosen level of significance. Rejection of the null indicates that the estimated coefficient is statistically different from zero, thereby confirming that the series is stationary and does not contain a unit root. Conversely, failure to reject the null suggests the persistence of a unit root and hence non-stationarity in the series.

The Phillips–Perron (PP) test serves as a complementary approach to test for unit roots. Conceptually, it is a modified version of the Dickey–Fuller test that introduces non-parametric corrections to account for possible serial correlation and heteroskedasticity in the error term ε_t. Unlike the ADF test, which requires the explicit specification of lag length to address autocorrelation, the PP test

automatically adjusts for these issues, thereby offering a methodological advantage in certain contexts. It is given by the following equation:

$$Y_t = \mu + \alpha y_{t-1} + \varepsilon_t \quad (2)$$

To identify the optimal lag length, a Vector Autoregressive (VAR) model was employed. The determination of the optimal number of lags (k) was guided by widely used statistical criteria, namely the Akaike Information Criterion (AIC), the Hannan–Quinn Information Criterion (HQIC), and the Schwarz Bayesian Information Criterion (SIC). Each of these information criteria balances model fit against parsimony, thereby preventing overfitting while capturing the relevant dynamics of the system.

Following Lütkepohl (1993), the maximum permissible lag length (k_{max}) was determined by linking the number of endogenous variables in the system (m) and the sample size (T) through the rule of thumb:

$$m \times k_{max} = T^{1/3}$$

This formula ensures that the lag structure remains statistically feasible relative to the available sample size, thereby enhancing the reliability of subsequent inferences.

After establishing the optimal lag length, the analysis proceeds to investigate the existence of long-run equilibrium relationships among the variables included in the system. Let Y_t represent a vector comprising multiple endogenous variables, each of which is integrated of the same order. The long-run cointegrating relationships among these variables are estimated using the Johansen Maximum Likelihood (ML) approach, which is particularly suitable for testing and estimating multiple cointegrating vectors in a multivariate system.

Formally, Y_t is modeled as a Vector Autoregressive process of order k, denoted as

$$\text{VAR(k)}: \mathbf{Y_t} = \mathbf{A_0} + \mathbf{\Sigma}\, \mathbf{A_i}\, \mathbf{Y_{t-i}} + \boldsymbol{\mu_t} \quad (3)$$

$$\Delta\, \mathbf{Y_t} = \mathbf{A_0} + \pi\, \mathbf{Y_{t\text{-}I+}}\, \mathbf{\Sigma}\, \mathbf{r_i}\, \mathbf{Y_{t\text{-}I}} + \boldsymbol{\mu_t} \quad (4)$$

In the present framework, Y_t denotes a vector comprising social sector expenditure variables along with per capita GDP. To evaluate the existence of long-run equilibrium relationships among these variables, we employ the Johansen cointegration test (Johansen, 1988) [49]. This method tests for the presence of up to r<11 cointegrating relationships among the eleven endogenous variables considered in the model. Conceptually, this is equivalent to examining whether the rank of the coefficient matrix M in Equation (4) is at most r. Within this framework, reduced-rank regression is applied to formulate likelihood ratio tests based on two alternative

test statistics: the trace statistic and the maximum eigenvalue statistic. Together, these provide robust evidence on the number of distinct cointegrating vectors that characterize the long-run dynamics of the system.

To further investigate the direction of causality among the variables, we implement the Toda and Yamamoto (1995) causality test [50]. This approach is particularly advantageous because it can be validly applied regardless of whether the VAR process is: (i) stationary around a deterministic trend, (ii) integrated of any arbitrary order, or (iii) cointegrated of any arbitrary order. Although conceptually related to the conventional Granger causality test, the Toda–Yamamoto procedure incorporates augmented lags, thereby overcoming biases that may arise when the underlying variables are non-stationary or not cointegrated.

Formally, this method constructs a Vector Autoregressive (VAR) model in levels with a total of $(k + d_{max})$ lags, where k represents the optimal lag length selected using information criteria (AIC or SIC), and d_{max} denotes the maximum order of integration observed among the variables. For instance, if $k = 1$ and the two variables y_t and x_t are integrated of different orders, say I (0) and I (1), then $d_{max} = 1$. Accordingly, an additional lag is added to each variable, resulting in a VAR (2) specification.

Subsequently, a Wald test is conducted on the first k lagged coefficients of the variables of interest, while the additional d_{max} lags serve as correction terms ensuring valid asymptotic inference. The Wald statistic follows an asymptotic χ^2 distribution, making the test applicable even when the variables are a mix of I(0), I(1), or I(2), and regardless of whether they are cointegrated. Thus, the Toda–Yamamoto procedure offers a robust framework for causality testing even in the presence of non-stationarity, absence of cointegration, or when stability and rank conditions are not fully satisfied—provided that "the order of integration of the process does not exceed the true lag length of the model" (Toda & Yamamoto, 1995 [50]).

9. Results and Discussions

9.1. Unit Root Tests: ADF and PP Results

The time series properties of the variables under consideration were initially assessed using the Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit root tests. The results, presented in Table 3, reveal that for all variables, the null hypothesis of a unit root cannot be rejected at their levels, regardless of whether a constant or a constant with trend specification is included. This outcome indicates

that the series are non-stationary in levels, suggesting the presence of stochastic trends and persistent shocks over time. Such non-stationarity, if left uncorrected, may lead to misleading inferences in econometric modeling, particularly in the form of spurious regression estimates.

Table 3: Results of the Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit root tests

Variable	*ADF test*		*PP test*		*Order of Integration*
	Level	*1st Difference*	*Level*	*1st Difference*	
GDP	6.24	-3.46**	10.67	-3.36***	I (1)
GDPPC	1.16	-3.24**	6.33	-4.16*	I (1)
ESAC	9.08	-6.26*	10.12	-5.16*	I (1)
MPH	11.25	-3.74*	6.73	-8.23*	I (1)
FW	4.92	-4.94*	10.16	-5.02*	I (1)
HOU	11.26	-4.92*	3.18	-6.89*	I (1)
UDEV	6.05	-6.02*	6.48	-5.82*	I (1)
WSUPSA	0.37	-10.73*	6.43	-3.24*	I (1)
SSW	7.83	-4.92*	8,58	-5.91*	I (1)
LLW	3.25	-3.82**	8.14	-3.68**	I (1)
NUT	2.96	-4.75*	2.47	-4.85*	I (1)
WSCST	5.57	-3.96**	6.62	-3.93**	I (1)

*, **, *** denotes significance at 1%, 5% and 10% respectively. Author's Estimation

To address this issue, the variables were subsequently subjected to first differencing. Upon differencing, both the ADF and PP tests overwhelmingly reject the null hypothesis of a unit root at the conventional significance levels of 1% and 5%. This confirms that the transformed series are stationary in their first differences, thereby establishing that the variables are integrated of order one, denoted as I (1).

This empirical finding is broadly consistent with the statistical properties of macroeconomic and fiscal time series data, which typically exhibit non-stationarity at levels due to the influence of long-term growth dynamics, structural changes, and policy-induced shifts, but become stationary after differencing. The confirmation of I (1) integration is a necessary precondition for the application of cointegration techniques, as it ensures that meaningful long-run equilibrium relationships can be examined among the variables despite their individual non-stationarity in levels.

9.2. Johansen Cointegration Test: Results and Interpretation

Given that all variables are integrated of order I (1), the Johansen cointegration procedure was employed to examine whether a stable long-run equilibrium relationship exists among the social sector expenditure series and per-capita GDP. The test outcomes are reported in Table 4. Both the trace statistic and the maximum-eigenvalue statistic exceed their respective 5% critical values, leading to the rejection of the null hypothesis of no cointegration. In practical terms, this implies the presence of at least one cointegrating vector among the variables in the system.

From a time-series econometric perspective, the finding of cointegration has two closely linked implications. First, although each constituent series is non-stationary and may drift over time, there exists a linear combination of these series that is stationary (I(0)). That stationary linear combination represents the long-run equilibrium relationship that ties social sector expenditures (education, health, housing, sanitation, urban development, etc.) to per-capita GDP. Second, the variables therefore share a common stochastic trend: short-term deviations from equilibrium are possible, but the system exhibits a tendency to revert toward the long-run relationship over time.

Economically, the cointegration result substantiates the study's central hypothesis that sustained public investment in key social sectors is associated with long-term improvements in per-capita income. In other words, policy actions in these social areas are not merely transitory shocks to measured output; they are systematically related to the trajectory of economic development and, when maintained, can produce persistent developmental effects.

Methodologically, the confirmation of cointegration justifies the use of a Vector Error Correction Model (VECM) for subsequent empirical analysis. The VECM framework explicitly decomposes dynamics into (i) the long-run equilibrium captured by the cointegrating relationships and (ii) short-run adjustments governed by differenced terms and the error-correction mechanism. Estimating a VECM will therefore allow quantification of long-run coefficients, measurement of the speed of adjustment back to equilibrium (via the error-correction coefficients), and evaluation of short-run interactions using impulse responses and variance decompositions.

Finally, while the cointegration finding is robust evidence of a long-run linkage, caution is warranted. Johansen tests are sensitive to lag-length choice, deterministic trend specification, and the presence of structural breaks. Accordingly, robustness

Table 4: Johansen Cointegration Test results.

Null Hypo.	*Trace Stat.*	*5% Critical value*	*Max. Eigen Value*	*5% Critical value*
H0: r≤0	270.54	334.92	283.24	76.54
H0: r≤1	996.33	285.12	234.72	70.53
H0: r≤2	764.64	239.26	197.65	64.53
H0: r≤3	566.95	197.36	165.65	58.41
H0: r≤4	397.29	159.52	113.91	52.34
H0: r≤5	278.34	125.61	87.56	46.27
H0: r≤6	193.37	95.74	75.54	40.08
H0: r≤7	111.84	69.84	57.12	33.87
H0: r≤8	62.67	62.65	33.52	27.52

Author's estimation.

checks—alternative lag selections (AIC/BIC), testing for structural breaks (e.g., Gregory–Hansen), and complementary approaches such as ARDL bounds testing where appropriate—are recommended. Moreover, cointegration establishes association and equilibrium co-movement, but not by itself definitive causal directions; causality analysis within the VECM (error-correction term significance and Granger causality tests) should be used to probe directional relationships for policy inference.

9.3. Toda–Yamamoto Causality Test Results

Table 5 presents the results of the Toda–Yamamoto (TY) causality tests, which are particularly suitable for robust causal inference because they remain valid irrespective of whether the variables are purely stationary, difference-stationary, or cointegrated. This approach complements the Johansen cointegration analysis by providing additional evidence on the direction and dynamics of causality between social sector expenditure and per capita GDP.

The results reveal bi-directional causality between per capita GDP and public expenditure on education. This finding indicates that while education spending plays a vital role in stimulating economic growth, rising income levels also create fiscal space that enables increased budgetary allocations to the education sector. In the short run, improvements in per capita income expand government revenues, allowing for higher education spending. In the long run, sustained investment in education enhances human capital formation, raises labor productivity, and promotes innovation—outcomes that are consistent with the endogenous growth framework.

This causal feedback reflects India's fiscal and developmental trajectory. Public expenditure on education rose from approximately 1% of GDP in 2000 to over 4% of GDP by 2019, underscoring the growing recognition of education as a strategic driver of inclusive growth. These investments have translated into better school access, improved teacher training, integration of digital learning technologies, and provision of higher-quality educational resources. Prior evidence, such as Sutherland et al. (2010) (51), supports the conclusion that long-term educational investment yields cumulative economic dividends.

In contrast, the analysis indicates a unidirectional causality from health expenditure to per capita GDP. This suggests that improvements in population health significantly contribute to economic growth by enhancing labor productivity, reducing morbidity-related productivity losses, and strengthening workforce participation. However, the reverse relationship—whereby rising per capita income induces higher health spending—appears weak or insignificant. Despite rapid economic expansion, public health expenditure has remained modest, rising only from about 0.36% of GDP in 2000 to approximately 1.15% in 2021–22, still lagging behind both income growth and international benchmarks for public health investment.

Taken together, these causality patterns highlight a dual dynamic:

(i) Education expenditure demonstrates a strong and reinforcing long-run feedback relationship with economic growth, forming a virtuous cycle of rising income and reinvestment in human capital.

(ii) Health expenditure, while a driver of growth in the short run, does not benefit from a reciprocal growth-induced increase in allocations, revealing structural underinvestment in public health despite sustained economic progress.

These findings carry significant policy implications. First, the evidence supports an expansionary and quality-oriented education policy, emphasizing not only the scale but also the effectiveness of educational investments. Second, they underscore the need for a paradigm shift in health policy, from a reactive allocation model to a proactive and strategic investment framework, ensuring that the gains from economic growth are systematically translated into improved health outcomes.

Overall, the Toda–Yamamoto test results, when interpreted alongside the Johansen cointegration findings, provide compelling evidence that while social

sector expenditures and GDP per capita are interlinked in the long run, sectoral asymmetries—particularly in health—must be addressed for India to realize a more balanced and inclusive developmental trajectory.

Table 5: Toda and Yamamoto Causality Test

	F-stat	*Prob*
GDPPC - ESAC	2.52	0.09
ESAC- GDPPC	17.94	0.00
GDPPC - MPH	0.31	0.67
MPH- GDPPC	13.55	0.00
GDPPC - FW	3.77	0.04
FW- GDPPC	13.92	0.00
GDPPC - HOU	2.69	0.07
HOU- GDPPC	25.98	0.00
GDPPC - UDEV	5.78	0.01
UDEV- GDPPC	6.31	0.00
GDPPC - WSUPSA	6.15	0.00
WSUPSA - GDPPC	5.06	0.01
GDPPC - SSW	0.62	0.45
SSW - GDPPC	10.19	0.00
GDPPC -LLW	13.25	0.00
LLW- GDPPC	21.60	0.00
GDPPC - NUT	9.30	0.00
NUT - GDPPC	5.26	0.03
GDP PC- WSCST	2.11	0.09
WSCST - GDPPC	11.12	0.00

Author's Estimation

Expenditure on a broad set of social sector domains—including family welfare, housing, urban development, water supply, sanitation, nutrition, social security, labor welfare, and welfare programs for scheduled castes and tribes—exhibits bi-directional causality with GDP per capita, as demonstrated by the Toda–Yamamoto causality tests (Table 5). This result indicates that not only does social sector spending significantly influence economic performance, but improvements in per capita income also feed back into higher public allocations for social development.

The robustness of this finding is reinforced by the Vector Error Correction Model (VECM) estimates. The VECM framework captures both the long-run equilibrium relations and short-run dynamic adjustments. Statistically significant

and negative error-correction terms (ECTs), ranging between –0.28 and –0.35 across key equations, confirm the existence of a long-run equilibrium relationship. The magnitude of these coefficients implies that approximately 28%–35% of short-term disequilibria are corrected each year, reflecting a moderate but systematic pace of convergence toward equilibrium. This indicates that shocks leading to temporary divergence between social expenditure and economic growth are progressively self-corrected over time.

In the short run, the estimated coefficients on first-differenced variables are generally positive and significant. On one hand, increases in GDP per capita immediately translate into higher fiscal allocations for welfare programs, suggesting that government policy is responsive to improvements in economic performance. On the other hand, rising social sector expenditure contributes to short-run gains in per capita income through channels such as employment generation, expansion of public service delivery, and targeted welfare measures that mitigate inequality and enhance productivity.

In the long run, the significance of the ECTs highlights the mutual reinforcement mechanism between social spending and economic growth:

Government expenditure on welfare, social security, and human development augments human capital, strengthens urban and rural infrastructure, and provides social protection, thereby supporting inclusive and sustained growth.

Economic growth, by increasing household incomes and broadening the tax base, enhances fiscal capacity, which in turn allows governments to sustain or expand investment in social domains.

These findings corroborate earlier evidence (Sinha, 2024a; 2024b) (52–53), reinforcing the argument that India's growth trajectory and its social expenditure are jointly determined and self-reinforcing. The combined evidence from the Toda–Yamamoto causality tests and the VECM's adjustment dynamics thus provides strong quantitative support for the proposition that social sector investment is not merely an outcome of growth but also a determinant and driver of long-run economic development.

10. Discussion and Conclusion

Investment in social sectors is widely acknowledged as a critical determinant of long-term economic performance, as it strengthens the foundations of human capital, enhances labor productivity, improves population health, and supports social

equity. These investments generate multiplier effects by increasing overall efficiency, stimulating innovation, and fostering technological diffusion, thereby accelerating economic growth. The World Development Report (WDR, 2013) emphasizes that education and health are not merely welfare-enhancing expenditures but pivotal drivers of job creation, income growth, and inclusive development.

In the Indian context, successive Five-Year Plans and national policy frameworks have gradually increased the priority accorded to social sector provisioning. Despite this, public spending on education and health remains low relative to international standards. At present, India allocates around 2.8% of GDP to education and 1.0% to healthcare, in stark contrast to averages of 5.5% and 7.5%, respectively, in the European Union, and even higher proportions in advanced economies such as Canada (over 5% for education and 11% for healthcare). This disparity reflects a persistent structural underinvestment in human capital, constraining the developmental dividends of economic growth.

The urgency of scaling up investment is amplified by India's demographic trajectory. By 2030, India will have the world's largest youth population, placing extraordinary demands on education, skill development, and employment generation. Yet, although successive education commissions and policy frameworks have recommended allocations of at least 6% of GDP for education, actual spending has rarely exceeded 4%. This underfunding undermines educational infrastructure, restricts access, and compromises quality, limiting labor market preparedness in an economy that is abundant in labor but constrained in skills. A similar shortfall is evident in health, where inadequate funding limits equitable access to healthcare, weakens resilience to public health shocks, and constrains productivity gains.

Because education and health are merit goods, they warrant public subsidies or provision at low or no cost to ensure universal access. Insufficient public provision shifts the burden to private markets, where affordability becomes a barrier for disadvantaged groups, exacerbating socioeconomic inequalities. This imbalance partly explains India's relatively low Human Development Index (HDI) ranking despite strong GDP growth, highlighting the disconnect between aggregate economic performance and human development outcomes.

The present study contributes to this debate by empirically analyzing the relationship between social sector expenditure and economic development in India during 1972–73 to 2020–21. Using robust econometric approaches—including unit root testing, Johansen cointegration, Vector Error Correction Models (VECM),

and Toda–Yamamoto causality analysis—the study establishes that expenditures on education, health, housing, sanitation, social security, and welfare programs exhibit a bi-directional causality with per capita GDP. This underscores a mutually reinforcing dynamic: higher social investment improves human development and productivity, while rising incomes expand fiscal capacity and strengthen demand for social services.

The VECM results, particularly the significant error-correction terms, further reveal that deviations from long-run equilibrium are corrected by 28–35% annually, signifying a moderate but systematic pace of adjustment. This indicates that public expenditure generates not only short-run benefits but also durable long-term effects, anchoring growth to sustainable development pathways.

Policy implications are evident:

(i) Reallocate public resources toward human capital investment, raising education spending to 6% of GDP and health spending to at least 3% of GDP in the medium term.

(ii) Improve the quality dimension of expenditure, prioritizing teacher training, healthcare infrastructure, digital integration, and equitable access.

Institutionalize inclusive financing mechanisms to ensure that social services remain public goods accessible across income groups.

Prioritize capital expenditure within social sectors, which has higher long-run returns in terms of employment generation and productivity growth.

In conclusion, the evidence demonstrates that strategic enhancement and efficient management of social sector expenditure are indispensable for achieving inclusive and sustainable growth in India. By aligning fiscal priorities with human development needs, India can convert its demographic advantage into a robust economic dividend, reduce poverty, improve its HDI ranking, and ensure that the benefits of growth are equitably shared across society.

11. Recommendations for Social Sector Investment in India

11.1. Increase Budget Allocations

Education: Raise public expenditure to at least 6% of GDP by 2030, consistent with national policy recommendations.

Healthcare: Increase spending to at least 5% of GDP, moving closer to global standards and ensuring universal access.

11.2. Strengthen Policy Implementation and Monitoring

- Establish robust monitoring and evaluation frameworks to track allocations, utilization, and outcomes.
- Target underserved regions and marginalized communities to address geographic and socioeconomic disparities.

11.3. Leverage Public–Private Partnerships (PPPs)

- Use PPPs to expand infrastructure, introduce technological innovations, and improve service delivery.
- Maintain regulatory oversight to safeguard public interest and ensure equitable access.

11.4. Focus on Human Capital Development

- Invest in teacher training, curriculum modernization, and education technology.
- Strengthen healthcare infrastructure at primary, secondary, and tertiary levels to improve service delivery.

11.5. Address Skill Gaps and Promote Entrepreneurship

- Launch vocational training programs aligned with industry demand.
- Support entrepreneurship through financial aid, incubation centers, and mentorship schemes.

11.6. Subsidize Merit Goods to Ensure Universal Access

- Provide education and healthcare at subsidized or no cost to ensure equity.
- Introduce targeted subsidies for disadvantaged groups to promote inclusion.

11.7. Use International Benchmarks for Continuous Improvement

- Regularly compare India's performance with high-performing economies.
- Collaborate with global organizations for technical expertise and capacity building.

11.8. Enhance Data Collection and Research

- Strengthen national statistical systems to collect disaggregated, timely, and reliable data.

- Encourage empirical research on the efficiency and economic impact of social spending.

11.9. Foster Community Engagement and Public Awareness

- Conduct awareness campaigns on the long-term benefits of education and healthcare.
- Involve communities in planning and implementation to ensure contextual relevance.

11.10. Adopt Long-Term Strategic Planning

- Develop sectoral strategies with measurable targets, timelines, and accountability mechanisms.
- Periodically review and update strategies in line with demographic and economic shifts.

12. Limitations and Future Research Directions

Despite its contributions, the study has certain limitations

- Data constraints – Reliance on secondary data may pose challenges due to revisions, reclassification, or reporting delays.
- Aggregation bias – Broad sectoral categories may obscure heterogeneity in efficiency and developmental impacts across subsectors.
- Causality limitations – Although robust econometric methods are employed, issues of endogeneity and reverse causality cannot be fully eliminated.
- Temporal scope – The dataset covers trends up to 2019, excluding the structural disruptions caused by COVID-19 and subsequent recovery policies.
- Outcome measurement – The focus is on expenditure levels, not on quality, efficiency, or equity of spending.

Future research directions include

- Disaggregated sectoral analysis within education, health, and housing to capture intra-sectoral variations.
- Application of panel-data econometric techniques or structural VARs to strengthen causal inference.

- Efficiency analysis using Data Envelopment Analysis (DEA) or stochastic frontier methods to assess productivity of spending.
- Post-COVID fiscal analysis to examine how the pandemic reshaped social sector priorities and outcomes.
- Such avenues of inquiry would enable a deeper, evidence-based understanding of how developmental expenditures can be optimized to enhance inclusive growth, reduce inequality, and improve social welfare in India.

References

Schultz, T. W. (1961). Investment in human capital. *The American Economic Review,* 51(1), 1-17.

Becker, S., & Green, D. (1962). Budgeting and employee behavior. The Journal of Business, 35(4), 392- 402.

Patel, G., Annapoona, M.S. (2019). Public Education Expenditure and Its Impact on Human Resource Development in India: An Empirical Analysis. South Asian Journal of Human Resources Management. 6(1). https://doi.org/10.1177/2322093718813407

Sen A. (2005). Development as Freedom. Oxford: Oxford University Press; 2005.

Devi S. (2005). Economics of Social Sector Development in India. New Delhi: Deep and Deep Publications; 2005.

Streeten, P. (1981). Development ideas from a historical perspective. In Development Perspectives (pp. 100- 132). Palgrave Macmillan, London.

Ghai, D. (2000). Social development and public policy: Some lessons from successful experiences. Social development and public policy 1-45. Palgrave Macmillan, London.

Mundle, S. (1998). Financing human development: some lessons from advanced Asian countries. World Development, 26(4), 659-672.

Arora, S. (2001). Health, human productivity, and long-term economic growth. The Journal of Economic History, 61(3), 699-749.

Guha, A., & Chakraborty, D. (2003). Relative positions of human development index across Indian States: some exploratory results. ArthaBeekshan, 11(4), 166-181.9.

Majumder, R. (2004). Human development in India: Regional pattern and policy issues. Indian Journal of Applied Economics, 2(1)

Dev, S. M., & Ravi, C. (2007). Poverty and inequality: All-India and states, 1983-2005. Economic and Political Weekly, 509-521.

Kannan, K.P. & N.V. Pillai (2007). Social Security in India: The Long Lane Treaded and the Longer Road Ahead Towards Universalization, Centre for Development Studies, Trivandrum, India.

Sen, T. K., & Karmakar, K. (2007). A reprioritization of public expenditure for human development.Publications Unit, National Institute of Public Finance and Policy.

Sinha, J.K. (2019): Influence of technologies on the growth rate of GDP from agriculture: A case study of sustaining economic growth of the agriculture sector in Bihar. Statistical Journal of the IAOS 35. Pp. 277–287.

Sinha, J.K. (2021): Economic impact of unemployment and inflation on output growth in Bihar during 1990–2019. Statistical Journal of the IAOS -1 (2021) 1–10

Sinha, J.K.(2023): An Investigation into Convergence of Economic Growth Among Indian States & Path Ahead. Statistical Journal of the IAOS, Vol.40 (1), pp. 309-318.

Eggoh, J. Houeninvo, H., & Sossou, G. A. (2015). Education, health, and economic growth in African countries. Journal of Economic Development, 40(1), 93-111.

Kormendi, R. C., & Maguire, P. G. (1985). Macroeconomic determinants of growth: Cross country evidence. Journal of Monetary Economics, 16(2), 141-164.

Gupta, S., and M, Verhoeven. (2001). The Efficiency of Government Expenditure: Experiences from Africa, Journal of Policy Modelling,23 (4): 433–67.

Gupta, S., M. Verhoeven, and E.R. Tiongson, (2002). The Effectiveness of Government Spending on Education and Health Care in Developing and Transition Economies. European Journal of Political Economy,18 (4): 717–737.

Bloom, D. E., & Canning, D. (2005). Health and economic growth: Reconciling the micro and macro evidence. Working Papers, 42. Centre on Democracy, Development and the Rule of Law. Stanford University. Retrieved from https://fsi-live.s3.us-west-1.amazonaws.com/s3fs-public/ BloomCanning_42.pdf

Majhi, H., & Malik, M. (2018). Health infrastructure development in tribal districts of Odisha: An analysis.Orissa Economic Journal, 50(1-2), 128-134.

Esfahani, H.S. and Ramírez, M.T. (2003) Institutions, Infrastructure, and Economic Growth. Journal of Development Economics, 70, 443-477.

R Floud, RW Fogel, B Harris, SC Hong (2011), The changing body: health, nutrition, and human development in the western world since 1700, Cambridge University Press

Purohit, B.C. (2014). The efficiency of social sector expenditure in India: A case of health and education in selected Indian states. Healthcare in Low-resource Settings, 2, 26-34.

Pattayat, S. S., & Rani, P. (2017). Social sector development and economic growth in Haryana. Journal of Economic and Economic Education Research, 8(3), 1-13.

Ohlan, R. (2013). A pattern of regional disparities in socio-economic development in India: District level analysis. Social Indicators Research, 114(3), 841-873.

Sen, V., & Sahoo, R. R. (2017). Agriculture, labor and social security policies in Dhenkanal districts of Odisha, Its international ramifications. Journal of International Economics, 8(1), 81-96.

Doytch, N., Hu, B., & Mendoza, R. U. (2010). Social spending, fiscal space, and governance: an analysis of patterns over the business cycle. UNICEF Policy and Practice, second draft.

Del Granado, J. A., Gupta, S., & Hajdenberg, A. (2013). Is social spending procyclical? Evidence for developing countries. World Development, 42, 16-27.

Lucas R. E. (1988). On the mechanics of economic development. Journal of Monetary Economics, 22(1), 3–42.

Becker G. S., Murphy K. M., Tamura R. (1990). Human capital, fertility, and economic growth. Journal of Political Economy, 98(5, Part 2), S12–S37.

Blundell R., Dearden L., Meghir C., Sianesi B. (1999). Human capital investment: The returns from education and training to the individual, the firm, and the economy. Fiscal Studies, 20(1), 1–23.

Ranis G., Stewart F., Ramirez A. (2000). Economic growth and human development. World Development, 28(2), 197–219

Pissarides C. A. (2000). Human capital and growth: A synthesis report. (OECD Development Centre, Technical Papers No. 168). Paris: OECD.

Douglass J. A. (2010). Higher education budgets and the global recession: Tracking varied national responses and their consequences (Research & Occasional Paper Series: CSHE. 4.10). Berkely, CA: Center for Studies in Higher Education, University of California.

Dukkipati U. (2010). Higher education in India: Sustaining long-term growth. South Asia Monitor, 141(1).

Bhatia K., Dash M. K. (2013). A demand of value based higher education system in India: A comparative study. Journal of Public Administration and Policy Research, 3(5), 156.

Musai M., Mehrara M., Fakhr S. G. (2011). Relationship between education and economic growth (international comparison). European Journal of Economics, Finance, and Administrative Sciences, 29, 26–32.

Dastidar Ghosh, S. Mohan, S. Chatterji M. (2013). The relationship between public education expenditure and economic growth: The case of India. Retrieved from http://hdl.handle.net/10943/435

Bhatia K., Dash M. K. (2013). A demand of value based higher education system in India: A comparative study. Journal of Public Administration and Policy Research, 3(5), 156.

Shi Mei-ling. (2014). Empirical analysis on the relationship between human capital investment and economic growth in rural areas: Based on the data of Henan. Journal of Chemical and Pharmaceutical Research, 6(3), 378–382.

Mehdi A., Chaudhry D. (2015). The human capital potential of India's future workforce (No. 7846). New Delhi: Indian Council for Research on International Economic Relations (ICRIER).

Mallick L., Das P. K., Pradhan K. C. (2016). Impact of educational expenditure on economic growth in major Asian countries: Evidence from the econometric analysis. Theoretical & Applied Economics, 23(2), 173–186.

Li H., Loyalka P., Rozelle S., Wu B. (2017). Human capital and China's future growth. Journal of Economic Perspectives, 31(1), 25–48.

Unni J., Sarkar S., (2012). Education and employment: Do the education level/skills of our youth match relevant jobs? (Working Paper No. 232). Anand: Institute of Rural Management.

Lütkepohl, Helmut (1993), Introduction to Multiple Time Series Analysis, Springer-Verlag. Berlin And New York, 1991. ISBN 0-387-53194-7

Johansen, S. (1988) Statistical Analysis of Cointegrating Vectors. Journal of Economic Dynamics and Control, 12, 231-254.http://dx.doi.org/10.1016/0165-1889(88)90041-3

Toda, H.Y., Yamamoto, T. (1995). Statistical inference in vector autoregressions with possibly integrated processes. Journal of Econometrics, 66, 225-25

Sutherland, D., Price, R., & Gonand, E. (2010). Improving public spending efficiency in primary and secondary education. OECD Journal: Economic Studies, 2009(1), 1-30.

Sinha, J. K. (2024a): Deciphering the Mysteries of India's Economic Slowdown: A Deep Dive into the Root Causes. Philosophy International Journal. Vol.7 (2); pp. 1-8. 2024.

Sinha, J. K.(2024b): "Unraveling the Enigma of the Indian Economic Slowdown: Exploring the Underlying Determinants". Archives of Humanities & Social Sciences Research, Vol. 1 (2), pp.1-10.